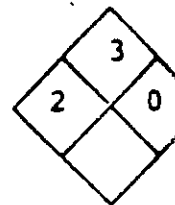


Union

MATERIAL HEALTH AND SAFETY BULLETIN

Union Chemicals Division
Petrochemical Group



UCD No. 863A

Product Code No. 1410

CAS# 108-88-3

UN No. 1294

MANUFACTURER'S NAME

Union Chemicals Division, Union Oil Company of California



STREET ADDRESS

1345 North Meacham Road

SEMS DocID **594208**

CITY, STATE, AND ZIP CODE

Schaumburg, Illinois 60196

Business Phone: (312) 885-5450

EMERGENCY TELEPHONE NO.

Transportation Emergencies call CHEMTREC (800) 424-9300
Health Emergencies Call Los Angeles Poison Control Center (24 hours) (213) 664-2121

<p>PRODUCT: <u>Toluene</u></p> <p>COMMON NAME: <u>AMSCO Solv 1410</u></p> <p>GENERIC NAME: <u>Volatile Solvent</u></p> <p>CHEMICAL NAME: <u>Toluene</u></p> <p>CHEMICAL FAMILY: <u>Aromatic Hydrocarbon</u></p> <p>DOT PROPER SHIPPING NAME: <u>Toluene</u></p>	<p>WARNING STATEMENT</p> <p>Warning Flammable. DO NOT induce vomiting if swallowed. For industrial use only.</p>
---	---

Section I - - INGREDIENTS

		TLV*	TLV*
Toluene		200A	Toluene 100%
		(100B&D)	

*Threshold Limit Value

A. OSHA ☒

B. ACGIH ☒

C. See Section III ☐

D. Other ☒

Cal-OSH

Section II - - EMERGENCY AND FIRST AID PROCEDURES

EMERGENCY: Have a physician call LOS ANGELES POISON CONTROL CENTER (24 hrs.) 213 664-2121

Eye Contact	If this product comes in contact with the eyes, flush with large quantities of water for at least 15 minutes and seek immediate medical attention.
Skin Contact	If this product comes in contact with the skin, wash with soap and large quantities of water and seek medical attention if irritation from contact persists.
Inhalation	If breathing difficulties, dizziness, or lightheadedness occur when working in areas with high vapor concentrations, victim should seek air free of vapors. If breathing stops, begin artificial respiration and seek immediate medical attention.
Ingestion	If this product is swallowed, DO NOT induce vomiting. Seek immediate medical advice and/or attention.

Section III - - PHYSIOLOGICAL EFFECTS AND HEALTH INFORMATION

Eye Effects	This product may be an eye irritant.
Skin Effects	This product may cause skin irritation upon prolonged or repeated contact.
Systemic Effects	Various studies have shown a possible association with exposure to this product and the following: Respiratory tract irritation Central nervous system depression in high concentrations Liver and kidney damage Brain cell damage may result from long term inhalation of toluene vapor (6/1/82)

Respiratory Protection (Specify Type)	The use of respiratory protection depends on vapor concentration above the time-weighted TLV; use a NIOSH approved cartridge respirator or gas mask.		
Ventilation	General mechanical ventilation may be sufficient to keep product vapor concentrations within specified time-weighted TLV ranges. If general ventilation proves inadequate to maintain safe vapor concentrations, supplemental local exhaust may be required. Other special precautions such as respiratory masks or environmental containment devices may be required in extreme cases.		
Protective Gloves	The use of impermeable gloves is advised to prevent skin irritation in sensitive individuals.	Eye Protection	Safety glasses, chemical goggles and/or face shields are recommended to safeguard against potential eye contact, irritation, or injury.
Other Protective Equipment	Impermeable aprons are advised when working with this product. The availability of eye washes and safety showers in work areas is recommended.		

Section V - REACTIVITY DATA

Section V - - REACTIVITY DATA			
Stability	Unstable		Conditions to Avoid:
	Stable	X	
Incompatibility (Materials to Avoid)	This product is incompatible with strong oxidizing agents strong acids or bases selected amines		
Hazardous Decomposition Products	Thermal decomposition in the presence of air may yield carbon monoxide and/or carbon dioxide.		
Hazardous Polymerization	May Occur		Conditions to Avoid:
	Will Not Occur	X	

Section VI - SPILL OR LEAK PROCEDURES

HIGHWAY OR RAILWAY SPILLS - CALL CHEMTREC 800/424-9300

Precautions in Case of Release or Spill	Keep sources of ignition and hot metal surfaces isolated from the spill. Flush spilled material into suitable retaining are or containers with large quantities of water. Small amounts of spilled material may be absorbed into an appropriate absorbant	
Reportable Quantity	Notify Coast Guard National Response Center; Phone No. 800-424-8802, if Spill is Greater Than <u>1000</u> lbs (Kilograms)	
Waste Disposal Method	Dispose of used product in accordance with applicable local, county, state and federal regulations.	

Section VII - STORAGE AND SPECIAL PRECAUTIONS

Handling and Precautions	Keep product containers cool, dry, and away from sources of ignition. Use and store this product with adequate ventilation. (See Section IV.)
Other Precautions	Personnel should avoid inhalation of vapors. (See sections I, II, III, V, VI) Personal contact with the product should be avoided. Should contact be made, remove saturated clothing and flush affected areas with water. (See sections II, IV, VI)

Section VIII - FIRE AND EXPLOSION HAZARD DATA

DOT Flammability Classification	Flammable Liquid	Flash Point Range: <input type="checkbox"/> Below 20° F, <input checked="" type="checkbox"/> 20° F - 100° F <input type="checkbox"/> 100° F - 200° F <input type="checkbox"/> Over 200° F <input type="checkbox"/> None to boiling
Extinguishing Media	Use foam, CO ₂ or dry chemical fire fighting apparatus.	
Unusual Fire and Explosion Hazards	Keep work areas free of hot metal surfaces and other sources of ignition	
Fire Fighting Procedures	The use of self-contained breathing apparatus is recommended for fire fighters. Water may be unsuitable as an extinguishing media, but helpful in keeping adjacent containers cool. Avoid spreading burning liquid with water used for cooling purposes.	

Section IX - PHYSICAL DATA

Approximate Boiling Range, ° F	231° - 232° F	Vapor Density: <input checked="" type="checkbox"/> Heavier Than Air <input type="checkbox"/> Lighter
Evaporation Rate: <input type="checkbox"/> Faster Than Ether <input checked="" type="checkbox"/> Slower	Percent Volatile: 100%	Solubility in Water: Negligible
Specific Gravity: <input checked="" type="checkbox"/> Lighter Than Water <input type="checkbox"/> Heavier	Weight per Gallon: 7.26	
Appearance and Odor:	This product is clear, has little if any color and has a characteristic odor.	

Section X - DOCUMENTARY INFORMATION

Product Code No. 1410	Revised 6/1/82 Issue Date 10/20/80	Revised 9/25/84 Prepared By Paul Pfeifer
Replaces: UCD No. 260	Product Code No. 1410	Issued 12/79
Reviewed By: <i>G. J. Jetter</i>	Manager, Loss Prevention	
Reviewed By: <i>Raines, Beck</i>	Director of Occupational Health & Toxicology	
Reviewed By: <i>John S. King</i>	Science and Technology Division	

The above information is believed to be correct as of the date hereof. However, no warranty of merchantability, fitness for any use, or any other warranty is expressed or is to be implied regarding the accuracy of these data, the results to be obtained from the use of the material, or the hazards connected with such use. Since the information contained herein may be applied under conditions beyond our control and with which we may be unfamiliar, and since data made available subsequent to the date hereof may suggest modification of the information, we do not assume responsibility for the results of its use. This information is furnished on the condition that the person receiving it shall make his own determination as to the suitability of the material for his particular purpose and on the condition that he assume the risk of his use thereof.

COMMON NAME: Hydrochloric Acid CHEMICAL NAME: _____

I. PHYSICAL/CHEMICAL PROPERTIES

Natural physical state: Gas
(at ambient temps of 20°C-25°C)

Molecular weight
Specific gravity
Solubility: water
Solubility: _____

Boiling point

Melting point

Vapor pressure

Vapor density

Flash point

(open cup _____; closed cup _____)
Other: _____

Liquid X Solid _____

36.5 g/g-mole

1.160-1.179 @ _____ °C

Very Soluble @ _____ °C

110 °C

-53 °C

50-60 mmHg @ 20 °C

NA @ _____ °C

II. HAZARDOUS CHARACTERISTICS

A. TOXICOLOGICAL HAZARD HAZARD?

Inhalation

Yes

Ingestion

Yes

Skin/eye absorption

Skin/eye contact

Yes

Carcinogenic

Teratogenic

Mutagenic

Aquatic

Other: _____

CONCENTRATIONS
(PEL, TLV, other)

TLV 5 ppm

Rabbit 900 mg/kg

SOURCE

B. TOXICOLOGICAL HAZARD HAZARD?

Combustibility

No

Toxic byproduct(s):

Flammability

No

LFL

UPL

Explosivity

LEL

UEL

CONCENTRATIONS

SOURCE

C.M. Laboratories, Inc. P.O. Box 8002 Portland, ME 04101 (207) 772-3689

Effective Date: 24 Sept. 1979

Product Name: # 165 Safety Solvent

Ingredients (Typical Values-Not Specifications) : % :

1;1;1 Trichloroethane (Minimum) : 93.5 :

Section 1

Physical Data

Boiling Point: 165F (74C) : Sol. in Water: 0.07G/100G @ 25C
 Vap Press: 100 MMHG @ 20C : Sp. Gravity: 1.306 @ 25/25C
 Vap Density (Air=1) : 4.55 : % Volatile By Vol: 100 (Essen.)
 Appearance and Odor: Colorless Liquid

Section 2

Fire and Explosion Hazard Data

Flash Point: None : Flammable Limits (STP in Air)
 Method Used: TOC, TCC, COC : LFL: 6.7% @ 100C UFL: 17.2% @ 100C
 Extinguishing Media: Water Fog
 Special Fire Fighting Equipment and Hazards: Self-Contained Respiratory Equipment. Not considered a flammable liquid hazard under ambient temperature use conditions.

Section 3

Reactivity Data

Stability: Avoid open flames, welding arcs or other high temperature sources which induce thermal decomposition.
 Incompatibility: Water-Slow Hydrolysis produces corrosive acid.
 Hazardous Decomposition Products: Hydrogen Chloride and very small amounts of Phosgene and Chloride.
 Hazardous Polymerization: Will not occur.

Section 4

Spill, Leak, and Disposal Procedures

Action to take for spills (Use appropriate Safety Equipment): Small Leaks: Mop up, wipe up or soak immediately. Remove to out of doors. Large Spills: Evacuate area. Contain liquid; transfer to closed metal containers. Keep out of water supplies.
 Disposal Method: Send solvent to a reclaimer. In some cases, small amounts may be transported to an area where it can be placed on the ground and allowed to evaporate safely if local, state, and Federal regulations permit.

Section 5

Health Hazard Data

Ingestion: Very low toxicity. LD50 (Laboratory animals) Ranges from 8.6 to 15.0 G/KG.
 Eye Contact: Mild Irritation, but essentially no corneal injury.

C.M. Laboratories, Inc. P.O. Box 8002 Portland, ME 04101 (207) 772-3689

Effective Date: 24 Sept. 1979

Product: #E165 Safety Solvent

Section 5 Health Hazard Data (Continued)

Skin Contact: Short Contact-No Irritation. Prolonged or frequent Exposure-Minor irritation. If confined to the skin-Up to moderate irritation.

Skin Absorption: Very Low. LD50 (Rabbits)- 24 hour exposure-Greater than 15 G/KG.

Inhalation: OSHA Guide and ACGIH TLV is 350 ppm.

Effects of Overexposure: Anesthetic Effects-May occur in the range of 1000 ppm. Can cause death if too much is breathed.

Section 6

First Aid-Note to Physician

First Aid Procedures:

Eyes: Irrigation of the eye immediately with water for five minutes is good safety practice.

Skin: Contact will probably cause no more than irritation. Wash off in flowing water or shower. Wash clothing before reuse.

Inhalation: Remove to fresh air if effects occur. If respiration stops give mouth-to-mouth resuscitation. Call physician and/or transport to medical facility.

Ingestion: Do not induce vomiting. Call a physician or transport to emergency facility.

Note to Physician:

Eyes: May cause conjunctivitis. Stain for evidence of corneal injury.

Skin: May cause mild irritation. Chronic exposure may cause defatting type of dermatitis. Treat as any contact dermatitis. Not likely to be absorbed in acutely toxic amounts.

Respiratory: Anesthetic or narcotic effect may occur. Administer oxygen if available. Bronchodilators, expectorants, and antitussives may be of help.

Oral: Low in toxicity. May cause reaction similar to petroleum or petroleum-like solvent. Danger of chemical pneumonia must be weighed against toxicity when considering emptying the stomach. If lavage is performed, suggest endotracheal and/or esophagoscopy control.

Systemic: May increase myocardial irritability. Avoid epinephrine or similar acting drugs if at all possible. Consult standard literature. No specific antidote. Treatment based on the sound judgement of the physician and the individual reactions of the patient.

M A T E R I A L S A F E T Y D A T A S H E E T

Page 3

C.M. Laboratories, Inc. P.O. Box 8902 Portland, ME 04101 (207) 772-3689

Effective Date: 24 Sept. 1979

Product: #165 Safety-Solvent

Section 7

Special Handling Information

Ventilation: Recommend control of vapors to suggested guide.

Respiratory Protection: None normally needed. Approved respiratory protection required in absence of proper environmental control. For emergencies, a self-contained breathing apparatus or a full-face respirator is recommended. Cartridge respirators are not recommended except for evacuation.

Protective Clothing: No special protective clothing needed.

Eye Protection: Safety glasses without side shields.

Section 8

Special Precautions and Additional Information

Precautions to be taken in handling and storage: Handle with reasonable care. Avoid breathing vapors. Store in a cool dry place. Vapors of this product are heavier than air and will collect in low areas such as pits, degreasers, storage tanks, and other confined areas. Do not enter these areas where vapors of this product are suspected unless special breathing apparatus is used and an observer is present for assistance.

Additional Information: Revisions 5/15/79---Effects of overexposure, Disposal Method. Revisions 9/24/79---Effects of Overexposure.

THE INFORMATION HEREIN IS GIVEN IN GOOD FAITH, BUT NO WARRANTY, EXPRESSED OR IMPLIED, IS MADE.

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Monsanto

MATERIAL SAFETY DATA

REC'D H & H APR 5 1984 Page 1 of 4

MONSANTO PRODUCT NAME

PHOSPHORIC ACID

MONSANTO COMPANY
800 N. LINDBERGH BLVD.
ST. LOUIS, MO 63167

Emergency Phone No.
(Call Collect)
314-694-1000

PRODUCT IDENTIFICATION

Synonyms: Phos acid; Orthophosphoric acid

Chemical Formula: H_3PO_4

CAS No.: 7664-38-2

DOT Proper Shipping Name: Phosphoric Acid

DOT Hazard Class/ I.D. No.: Corrosive material/UN1805

DOT Label(s): Corrosive

Hazardous Substance(s)/ RQ(S): Yes/5,000 lbs.

U.S. Surface Freight Classification: Phosphoric Acid

WARNING STATEMENTS

DANGER!
CAUSES BURNS

PRECAUTIONARY MEASURES

Do not get in eyes, on skin, on clothing.
Avoid breathing mist.
Keep container closed.
Wash thoroughly after handling.*

*CORROSIVE TO MILD STEEL added here on 75% and 80% acid label. All concentrations of Phosphoric Acid for which this MSDS apply are corrosive to mild steel. In addition, 85% Phosphoric Acid exceeds the DOT protocol for corrosivity to animal tissue.

EMERGENCY AND FIRST AID PROCEDURES

IF IN EYES OR ON SKIN, immediately flush with plenty of water for at least 15 minutes. Wash clothing before reuse.

Monsanto

MATERIAL SAFETY DATA

102
REV D H & H APR 5 1984 Page 1 of 4

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800 N. LINDBERGH BLVD.
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EMERGENCY AND FIRST AID PROCEDURES

FIRST AID: IF IN EYES OR ON SKIN, immediately flush with plenty of water for at least 15 minutes. If on clothing, remove clothing. Call a physician. Wash clothing before reuse.

into MATERIAL SAFETY DATA

UPATIONAL CONTROL PROCEDURES

Protection: Wear chemical safety goggles to prevent eye contact. Have eye baths immediately available where eye contact can occur.

Skin Protection: Wear appropriate impervious gloves and protective clothing to prevent skin contact. Wear face shields and impervious aprons when splashing is likely. Remove contaminated clothing promptly and launder before reuse. Provide safety shower at any location where skin contact can occur. Wash contaminated skin promptly.

Respiratory Protection: Use NIOSH approved equipment with full facepiece when airborne exposure limits are exceeded. Consult respirator manufacturer to determine appropriate type equipment for given application.

Ventilation: Provide ventilation to minimize exposure. Local exhaust ventilation preferred.

Airborne Exposure Limits: Product: Phosphoric acid

OSHA PEL/TWA:	1 mg/m ³
ACGIH TLV/TWA:	1 mg/m ³
TLV/STEL:	3 mg/m ³

FIRE PROTECTION INFORMATION

Extinguishing Media: Although Phosphoric Acid does not meet the parameters for flammability, it can react with metals to liberate hydrogen, a flammable gas. In this case, water spray may be effective in absorbing gas.

This material is not combustible.

REACTIVITY DATA

Materials To Avoid: Avoid contact with materials such as sulfides and sulfites which could release toxic gases, and be cautious in mixing with strong bases because high heat of reaction can generate steam.

Hazardous Decomposition Products:

None.

Hazardous Polymerization: Does not occur.

PHYSIOLOGICAL EFFECTS SUMMARY

The following data were generated for Phosphoric Acid 85% and 75%.

Oral LD₅₀ (Rat): 3,500 to 4,400 mg/kg, Slightly Toxic
Dermal LD₅₀ (Rabbit): 1,260 to >3,160 mg/kg, Moderately Toxic
Eye Irritation (Rabbit) (EPA) Corrosive

Monsanto MATERIAL SAFETY DATA

PHYSICAL DATA

Appearance and Odor: Clear, colorless, syrupy liquid; no foreign odor

Vapor Pressure @ 20°C (mm Hg): 0.0285 (100% acid)

Solubility in Water: Complete

	75%	80%	85%
Boiling Point:	135 °C	144 °C	154 °C
Freezing Point:	-17.5 °C	+4.6 °C	+21.1 °C
Viscosity @ 25°C (centistokes):	12	17	23
Specific Gravity @ 25°C/15.5°C:	1.575	1.633	1.692
% Equivalent H_3PO_4:	75.1	80.35	85.5
Lbs./gallon @ 25°C:	13.17	13.66	14.15

Note: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specification items.

SPILL, LEAK & DISPOSAL INFORMATION

Waste Disposal: Because of its corrosive characteristics, unneutralized Phosphoric Acid, when discarded, is a *hazardous waste* as defined in 40 CFR 261.22 (RCRA regulations), and disposal procedures are controlled by RCRA rules.

Spill or Leakage Procedures:

Contain spills and leaks to prevent discharge to the environment. Neutralize cautiously with a base such as soda ash and discard per RCRA regulations. Phosphoric Acid is a *hazardous substance* per 40 CFR 117 (Section 311 of the Clean Water Act) with a reportable quantity of 5,000 pounds. If 5,000 pounds or more are spilled or discharged to the environment, it must be reported to the National Response Center.

ADDITIONAL COMMENTS

Store in rubber-lined or 316 stainless steel tanks designed for H_3PO_4 . Store drums away from heat and out of direct sunlight.

This is *not* a *hazardous material* as defined in 29 CFR, Section 1915.2.

It is a *hazardous material* per 49 CFR, Section 172.101 (DOT regulations).

Consult Manufacturing Chemists Association Chemical Safety Data Sheet SD-70 for more particulars on safety of Phosphoric Acid.

DATE: 5/1/83

REVISED: X

SUPERSEDES: 10/1/82

MSDS NO: 007664382

FOR ADDITIONAL NON-EMERGENCY INFORMATION, CONTACT:

Dolores M. Wentz
Product Acceptability Coordinator
Monsanto Industrial Chemicals Co.
314-694-2096

(A Chemical Manufacturing Company)

MATERIAL SAFETY DATA

Phosphoric Acid

Monsanto MATERIAL SAFETY DATA

Page 4 of 4

Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be correct as of the date hereof, Monsanto Company makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will Monsanto Company be responsible for damages of any nature whatsoever resulting from the use of or reliance upon Information. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

AXTON-CROSS COMPANY

P. O. BOX 528

INDUSTRIAL CHEMICALS

617-429-6766

CROSS STREET
HOLLISTON, MASSACHUSETTS 01746

18 DEC 1986

American Glue + Resin
40 School St.
Middleton, MA 01949

Dear Sir/Madam:

Enclosed are the following Material Safety Data Sheets:

PRODUCT

235011 MURIATIC ACID 20%

REQUESTED BY

STARLEY OTERI

Sincerely,

Axton Cross

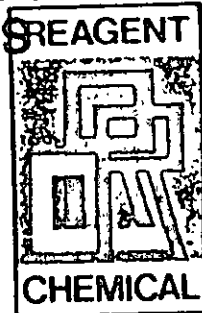
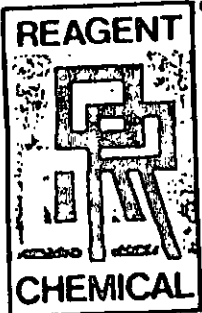
REVISED MSDS

DISTRIBUTED BY

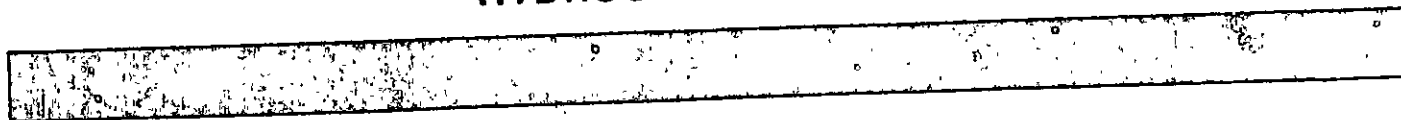
REAGENT CHEMICAL
& RESEARCH INC.

124 River Road
Middlesex, New Jersey 08846

MATERIAL SAFETY DATA BULLETIN
(CONFORMS TO CFR 1910.1200g AMENDED)
Revised 1 July 1986



HYDROCHLORIC ACID



TRANSPORTATION EMERGENCY PHONE Telephone No. 800-231-1807 Telephone No. 800-424-9300 (Chemtrec)		NFPA		
PRODUCT NAME Hydrochloric Acid, 20°-22° Baume'		HMIS 3-0-1-X		
NON-TRANSPORTATION EMERGENCY PHONE 800-231-1807		IMCO CLASS 8102		
PRODUCT CODE NUMBER CAS-7647-01-0		DOT HAZARD CLASS Corrosive Material UN 1789		
RCRA WASTE NUMBER D002		REPORTABLE QUANTITY RQ 5000 lbs.		
CHEMICAL FORMULA Hcl		TRADE NAME & SYNONYMS Hydrochloric Acid — Muriatic Acid		
HAZARDOUS INGREDIENTS				
HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS OR GASES Hydrogen Chloride		% 31.5-36%	CURRENT TLV 5 ppm	
PHYSICAL DATA				
APPEARANCE (SOLID, LIQUID, GAS) Liquid @ 20 C and 1 atmos	MOLECULAR WEIGHT 36.5	FREEZING -63 F; -53 C	SPECIFIC GRAVITY 1.1600-1.1789	
VAPOR DENSITY (AIR=1) N.A.	COLOR Clear colorless Slight yellow	BULK DENSITY 9.671-9.828 Lbs./Gal.	BOILING POINT 110°C/230°F	
VAPOR PRESSURE 50-60 mm Hg @ 20°C.	SOLUBILITY(water) Very soluble	ODOR Sharp, pungent, irritant	% VOLATILE BY VOL. N.A.	
FIRE & EXPLOSION DATA				
FLASH POINT °F (METHOD USED) N.A.	FLAMMABLE LIMIT Non-Flammable		EXTINGUISHING MEDIA N.A.	
SPECIAL FIRE FIGHTING PROCEDURES, UNUSUAL FIRE OR EXPLOSION HAZARDS Non-flammable, but Hydrochloric Acid reacts with all metals, except gold and platinum, with rapid evolution of Hydrogen which is flammable and explosive in air. Firefighters exposed to Hydrochloric Acid vapors should wear Scott Air-Pak or equivalent. Hydrogen Chloride vapors are extremely irritating to the respiratory tract and may cause breathing difficulty.				

GENERAL

Hydrogen Chloride, both as a gas and in a solution as Hydrochloric Acid, is a corrosive substance and can cause severe and painful burns on contact with any part of the body or if taken internally. The mucous membranes of the eyes and the upper respiratory tract are especially susceptible to the irritating effects of high atmospheric concentrations of Hydrogen chloride. The gas or vapor is so penetrating and pungent that when high concentrations do occur those exposed should immediately leave the contaminated area.

INGESTION

When concentrated Hydrochloric Acid is swallowed, it causes severe burns of the mucous membranes of the mouth, esophagus and stomach. The lips and mouth usually turn white, and later brown. There is pain in the throat and stomach, difficulty in swallowing, intense thirst, nausea and vomiting, followed by diarrhea and, in severe cases, by collapse and unconsciousness.

EYE CONTACT

Contact of the eyes with Hydrogen Chloride, either as a gas or in solution, rapidly causes severe irritation and painful burns of the eyes and eyelids. If the acid is not quickly removed by thorough irrigation with water, there may be prolonged or permanent visual impairment or total loss of sight. Wash the affected area for 15 minutes with large amounts of water.

SKIN CONTACT

Concentrated solutions are destructive to clothing and on contact with skin, cause severe burns unless promptly washed off. Repeated skin contact with dilute solutions may lead to the development of dermatitis. Exposure to the concentrated vapor of anhydrous Hydrogen Chloride may also result in burns or dermatitis.

INHALATION

Inhalation of excessive concentrations of Hydrogen Chloride vapors immediately produces severe irritation of the upper respiratory tract, resulting in coughing, burning of the throat, and a choking sensation. Reactions encountered in man have usually been limited to inflammation and occasional ulceration of the nose, throat and larynx. If inhaled deeply, edema of the lungs may occur.

TOXICOLOGY DATA**(a) Toxicity:**

Inhalation, human LCLo 1300 ppm/30 min.
Oral, rabbit LD₅₀ 900 mg/Kg.

(b) Mutagenic Effects:

Chromosome damage, Inhalation 100 ppm/24 hours
Chromosome damage, Oral 100 ppm
Cytogenic effects, Parenteral 20 mg

(c) OSHA Standard: Air, TLV 5 ppm

Air: TLV 7 mg/cubic meter

(d) ACGH Limit Values: Hydrogen Chloride TWA-STEL 5 ppm

TWA-STEL 7 mg/cu meter

(e) TOSCA: Reported in TOSCA Inventory in 1980

NOTE: The sources of the toxicology data are:

1. NIOSH-Registry of Toxic Effects of Chemical Substances 1982 Volume 1 and II.
2. Patty-Industrial Hygiene and Toxicology Volume 2-A, B, C
3. American Conference of Governmental Industrial Hygienists-1984.

The above quoted data is an abstract only of the complete information disclosed in the source documents. Reagent will supply, upon request, photos of the complete source documents referred to herein. Please phone the nearest Reagent Sales Office

TOXICOLOGY DATA**CARCINOGENIC STATEMENT:**

National Toxicology Register ☐ No
IARC Monograph ☐ No

OSHA Register ☐ No
ACGIH 1985-86 ☐ No

CHEMICAL REACTIVITY**GENERAL**

Hydrochloric Acid is chemically stable when properly contained and handled. It is a strong mineral acid and reacts with many metals and metal oxides and hydroxides to form the equivalent metal chloride. It reacts with zeolites and other silicious compounds to form Hydrosilicic Acid, it reacts with carbonates to form Carbon Dioxide and water. It is oxidized by oxygen or electrolysis to form chlorine, a lethal, poisonous gas. It reacts with alkaline compounds to form a neutral salt. It is a hydrolyzing agent for carbohydrates, esters and other compounds.

The reaction of Hydrochloric Acid with most metals will produce Hydrogen, an explosive, flammable gas.

STABILITY**GENERAL**

Hydrochloric Acid is a stable compound and forms an azeotrope that boils at 108.6 °C. or 227.5 °C. at one atmosphere and contains 20.22% Hydrogen Chloride.

The gaseous form, Hydrogen Chloride, begins dissociation at 1500 °C. or 2732 °F.

FIRST AID**GENERAL**

If a known exposure occurs or is suspected, immediately initiate the recommended procedures below. Simultaneously contact a physician, the nearest hospital, or the nearest Poison Control Center. Inform the person contacted of the type and extent of exposure, describe the victim's symptoms and follow the advice given. For additional information, call, day or night Reagent (800) 231-1807 or Chemtrec (800) 424-9300.

INGESTION

DO NOT induce vomiting. Immediately give large quantities of water or milk, if available. If vomiting does occur, give fluids again. Never give anything by mouth to an unconscious person. Call a physician or the nearest Poison Control Center immediately.

EYE CONTACT

Immediately flush the eyes with large quantities of running water for a minimum of 15 minutes. Hold the eyelids apart during the flushing to ensure rinsing of the entire surface of the eyes and lids with water. Do not attempt to neutralize with chemical agents. Obtain medical attention as soon as possible. Oils or ointments should not be used. Continue the flushing for an additional 15 minutes if the physician is not immediately available.

SKIN CONTACT

Immediately remove contaminated clothing under a safety shower. Flush all affected areas with large amounts of water for at least 15 minutes. Do not attempt to neutralize with chemical agents. Obtain medical advice immediately.

INHALATION

Remove from contaminated atmosphere. If breathing has ceased, clear the victim's airway and start mouth-to-mouth artificial respiration, which may be supplemented by the use of a bag-mask respirator, or a manually-triggered, oxygen supply capable of delivering 1 liter/second or more. If the victim is breathing, oxygen may be administered from a demand-type or continuous-flow inhalator, preferably with a physician's advice. Contact a physician immediately.

SPILL, DISCHARGE OR DISPOSAL

GENERAL

Spill or discharges into the environment involving large quantities of Hydrochloric Acid should be controlled and cleaned up according to a pre-determined, affirmative, written Spill Prevention and Control Program. For assistance in developing a SPCP contact your nearest Reagent Sales Office.

PERSONNEL

All personnel involved in a spill clean-up should follow the recommendations and practices set forth below (refer to Industrial Hygiene)

PROCEDURE

Spills should be handled immediately by neutralization and dilution of the spilled Product by the use of Soda Ash (Sodium Carbonate), Lime (Calcium Hydroxide) or Limestone (Calcium Carbonate) with large amounts of water. For an interior (inside a closed space) spill be aware that the use of Soda Ash and Limestone will evolve Carbon Dioxide and that ample ventilation be provided.

DISPOSAL

Under Federal RCRA, it is the responsibility of the user of Products to determine, at the time of disposal, whether the Product falls under the RCRA as a hazardous waste. This is because Product uses, transformations, synthesis, mixtures, etc. may render the resulting end-product hazardous.

INDUSTRIAL HYGIENE

EYE CONTACT

Chemical safety glasses, chemical goggles and/or full face shields must be worn at all times by personnel exposed to or handling Hydrochloric Acid.

SKIN CONTACT

Impervious clothing, gloves, footwear and head gear must be worn at all times by Personnel exposed to or handling Hydrochloric Acid.

INHALATION

The use of a NIOSH approved full face piece cartridge respirator or a Scott Air-Pak should be used by all personnel exposed to or handling Hydrochloric Acid.

DISCLAIMER OF LIABILITY

The data contained herein is furnished gratuitously and independent of any sale of any product. It is supplied only for your investigation and possible independent verification.

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Material Safety Data Sheet

C misc

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U.S. Department of Labor, Occupational Safety and Health (OSHA)

Date: March, 1980	Edition: Third
Chemical Name and Synonyms: Sodium Hydroxide	Trade Name and Synonyms: Caustic Soda Liquid 50%
CAS No.: 1310-73-2	Formula: NaOH
Chemical Family: Alkali	DOT Hazard Class: Corrosive Material
DOT Shipping Name: Caustic Soda Liquid, 50%	

SECTION 1 - PHYSICAL DATA

Boiling Point @ 760 mm Hg: 142°C 288°F	Vapor Density (Air=1): Not Applicable	Specific Gravity (H ₂ O=1): 60°/60°F = 1.530	pH of Solutions. All solutions are strongly basic
Freezing/Melting Point: 5°-11°C 41°-51°F	Solubility (Weight % in Water): appreciable > 10% 347g/100g water @ 100°C	Bulk Density: 12.76 lbs./gal. @ 60°F	Volume % Volatile: 50
Vapor Pressure: < 1 mmHg	Evaporation Rate Not Applicable (=1)	Heat of Solution: Exothermic	Appearance and Odor: water white to slightly turbid liquid; no odor

SECTION 2 - HAZARDOUS INGREDIENTS

	%	Hazard Data
Sodium Hydroxide	50	Corrosive
BORDEN & REMINGTON CORP. EVERETT, MASS. 307-7607 FALL RIVER, MASS. 675-0101 		

SECTION 3 - FIRE AND EXPLOSION HAZARD DATA

Flash Point °F (Method Used) None	Flammable Limits in Air (% by Volume) Not Applicable LEL: UEL:	Extinguishing Media: Not Applicable
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Special Fire Fighting Procedures: Not Applicable

Unusual Fire and Explosion Hazards: Contact with some metals particularly magnesium, aluminum, and zinc (galvanized) can generate hydrogen rapidly, which is explosive.

SECTION 4 - HEALTH HAZARD DATA

Permissible Exposure Limits (TLV): 2mg/m³ - OSHA, 29CFR 1910.1000, May 28, 1975

Toxicity Data See Section 5	Classification (Poison, Irritant, Etc.)
LC ₅₀ Inhalation	Inhalation: Irritant
LD ₅₀ Dermal	Skin/Eye: Corrosive
LD ₅₀ Ingestion	Ingestion: Corrosive
Fish, LC ₅₀ (Lethal Concentration)	Aquatic:
Human Exposure Information/Data:	See Section 5

SECTION 5 - EFFECTS OF OVEREXPOSURE

This section covers effects of overexposure for inhalation, eye/skin contact, ingestion and other types of overexposure. Information in the order of the most hazardous and the most likely route of overexposure.

Route

Eye Contact: Causes severe burns; small quantities can result in permanent damage and loss of vision.

Skin Contact: Corrosive action causes burns and frequently deep ulceration with extensive scarring. Prolonged contact destroys tissue. Mist from solutions can cause irritant dermatitis.

Ingestion: Ingestion can cause very serious damage to the mouth, esophagus, stomach, and other tissues with which contact is made and may be fatal.

Inhalation: Inhalation of mists can cause damage to the upper respiratory tract and to the lung tissue depending on extent of exposure. Effects can range from mild irritation of mucous membranes to severe pneumonitis.

SECTION 8 • SPECIAL PROTECTION INFORMATION

Respiratory Protection: NIOSH/MSHA approved mechanical filter type _____ exposure to mists above permissible exposure limit. Respiratory protection program must be in accordance with 29CFR 1910.134.

Ventilation (Type): Local Exhaust - Sufficient to minimize employee exposure to mists below permissible exposure limit.

Protection:

Use fitting chemical safety goggles with face shield

Gloves:

Rubber or PVC

Other Protective Equipment: Rubber boots with safety toes, rubber aprons, PVC clothing, plastic hard hat; eye-wash fountain and safety shower in immediate area. Personnel protective clothing and use of equipment must be in accordance with 29CFR 1910.133.

SECTION 9 • SPECIAL PRECAUTIONS

Precautions to be Taken During Handling and Storing:

When handling, wear safety goggles and face shield, rubber gloves, rubber boots, rubber apron, cotton or polyester long-sleeved shirt and plastic hard hat.
Wear NIOSH/MSHA-approved respirator for protection where mists may be generated.
Never touch eyes or face with hands or gloves that may be contaminated with caustic soda.
Never enter a caustic soda storage tank or container (tank truck or tank car)--even if it appears to be empty.
Avoid contact with organic materials and concentrated acids--may cause violent reaction; caustic soda reacts with magnesium, aluminum, zinc (galvanized), tin, chromium, brass and bronze, generating hydrogen which is explosive. Also, caustic soda may react with various sugars to generate carbon monoxide.
When diluting, add 50% liquid caustic soda slowly to surface of cold water to avoid splashing.

Other Precautions:

DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
Can cause severe injury or blindness.

AVOID BREATHING MIST.

DO NOT TAKE INTERNALLY.

WASH THOROUGHLY AFTER HANDLING.

FOR ADDITIONAL PRODUCT INFORMATION, CONTACT PPG INDUSTRIES, INC.

References:

Dangerous Properties of Industrial Materials, N. Irving Sax, Fourth Edition, 1975
Occupational Exposure to Sodium Hydroxide, NIOSH, 1975

Comments: Hazardous carbon monoxide gas can form upon contact with food and beverage products in enclosed vessels and can cause death. Follow appropriate tank entry procedures (see ANSI Z177.1 - 1977).

EMERGENCY AND FIRST AID PROCEDURES:

Inhalation: Remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

Eye or Skin Contact: Immediately flush eyes with plenty of water for at least 15 minutes. Hold eyelids open during this flushing with water. Call a physician. Immediately flush skin with plenty of water while removing contaminated clothing and boots. Call a physician. If skin feels slippery, caustic may still be present in sufficient quantities to cause irritation or burn. Continue washing until slick skin feeling is gone. Thoroughly clean contaminated clothing and boots before reuse or discard.

Ingestion: If conscious, drink a quart of water. DO NOT induce vomiting. Take immediately to a hospital or physician. If unconscious or in convulsions, take immediately to a hospital or physician. DO NOT induce vomiting or give anything by mouth to an unconscious person.

Notes to Physician (Including Antidotes):

SECTION 6. REACTIVITY DATA

Stability:	Stable	Conditions to Avoid: Materials listed below
Hazardous Polymerization:	Will not occur	Conditions to Avoid: None

Incompatibility (Materials to Avoid): Organic materials and concentrated acids--may cause violent reactions; caustic soda reacts with magnesium, aluminum, zinc (galvanized) tin, chromium, brass and bronze generating hydrogen which is explosive. Also, caustic soda may react with various food sugars to generate carbon monoxide (see comments, page 4).

Hazardous Decomposition Products: Reaction with various food sugars may form carbon monoxide

SECTION 7. SPILL OR LEAK PROCEDURES

Steps to be Taken if Material is Spilled or Released: Dike area to contain spill. Only trained person with proper protective equipment should be permitted in area. Reclaim if possible. Or dilute spill with large amounts of water then neutralize with dilute acid. Use vacuum truck to pick up neutralized material for disposal (see below). After all visible traces have been removed, flush area with large amounts of water.

Waste Disposal Method: Dispose of in approved hazardous waste facility. Care must be taken using or disposing of chemical materials and/or their containers to prevent environmental contamination. It is your duty to dispose of the chemical materials and/or their containers in accordance with the Clean Air Act, the Clean Water Act, the Resource Conservation and



MATERIAL SAFETY DATA SHEET

(Approved by U.S. Department of Labor "Essentially Similar" to OSHA 158.4)



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REC'D H&M MAY 6 1984

CHEMICAL NAME: FORMALDEHYDE, 37% (Uninhibited)

SYNONYMS: Aqueous Formaldehyde, formalin solution

CHEMICAL FAMILY: Aldehydes

FORMULA: HCHO + Polymers in Solution

MOLECULAR WEIGHT: 60, average

TRADE NAME AND SYNONYMS: Formaldehyde

I. PHYSICAL DATA

BOILING POINT, 760 mm. Hg	98°C. (210°F.)	PRECIPITATION TEMPERATURE	20°C.
SPECIFIC GRAVITY (H ₂ O = 1)	1.110 at 25/25°C.	VAPOR PRESSURE AT 20°C. (HCHO PARTIAL PRESSURE)	1.0 mm. Hg
VAPOR DENSITY (air = 1)	1.01 (Vapor over solution)	SOLUBILITY IN WATER, % by wt.	Complete
PER CENT VOLATILES BY VOLUME	100	EVAPORATION RATE (WATER = 1)	1
APPEARANCE AND ODOR	Clear, colorless liquid; pungent, characteristic odor.		

II. HAZARDOUS INGREDIENTS

MATERIAL	%	TLV (Units)
Formaldehyde	37	2 ppm. (as HCHO)

III. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (test method)	185°F., Tag closed cup	AUTOIGNITION TEMPERATURE (HCHO)	806°F.
FLAMMABLE LIMITS IN AIR, % by volume (HCHO)	LOWER	7.0	UPPER 73.0

EXTINGUISHING MEDIA	Use carbon dioxide or dry chemical for small fires. Use water and alcohol-type foam for large fires.
SPECIAL FIRE FIGHTING PROCEDURES	None
UNUSUAL FIRE AND EXPLOSION HAZARDS	None

EMERGENCY PHONE NUMBERS

Dr. C. U. Dernehl, 212/551-4785; 914/946-0646 (night)
Dr. K. S. Lane, 212/551-4787; 914/666-3656 (night)
C. P. Carpenter, Ph.D., 412/327-1020; 412/241-7896 (night)

Legal responsibility is assumed only for the fact that all studies reported here and all opinions are those of qualified experts.

UNION CARBIDE CORPORATION • CHEMICALS AND PLASTICS • 270 PARK AVENUE, NEW YORK, N.Y. 10017

IV. HEALTH HAZARD DATA

LD LIMIT VALUE	2 ppm.
S OF OVEREXPOSURE	If inhaled, vapors are irritating and will cause coughing, chest pain, nausea, and vomiting. If swallowed, will cause nausea, vomiting, abdominal pain, and collapse. Contact with skin and eyes causes severe irritation.
EMERGENCY AND FIRST AID PROCEDURES	If inhaled, remove to fresh air. Give oxygen if breathing is difficult. Call a physician. If swallowed, induce vomiting at once and repeat until vomit is clear. Then give milk or raw egg, and call a physician. Immediately flush skin and eye contact with plenty of water for at least 15 minutes while removing contaminated clothing. Call a physician for eyes.

V. REACTIVITY DATA

STABILITY		CONDITIONS TO AVOID	None
UNSTABLE	STABLE		
---	✓		
INCOMPATIBILITY (materials to avoid)		Avoid contamination with strong alkalis or mineral acids.	
HAZARDOUS DECOMPOSITION PRODUCTS		Thermal decomposition may produce carbon monoxide and/or carbon dioxide.	
HAZARDOUS POLYMERIZATION		CONDITIONS TO AVOID	Avoid strong alkalis or mineral acids.
May Occur	Will not Occur		
✓	---		

VI. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED	Flush with copious amounts of water. Can be neutralized with dilute ammonia, then rinsed with water.
WASTE DISPOSAL METHOD	Mix in small proportions with burnable liquids and incinerate.

VII. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (specify type)		Air-supplied mask	
VENTILATION	LOCAL EXHAUST	Preferred	SPECIAL Handle large volumes in completely closed equipment.
	MECHANICAL (general)	---	
PROTECTIVE GLOVES		Plastic or rubber	EYE PROTECTION Safety goggles, vapor tight
OTHER PROTECTIVE EQUIPMENT		Rubber boots, apron, eye bath, and safety shower	

VIII. SPECIAL PRECAUTIONS

PRECAUTIONARY LABELING

FORMALDEHYDE, 37% (Uninhibited)

ANGER!
VAPOR OR LIQUID
CAUSES SKIN, EYE, NOSE,
AND THROAT IRRITATION.



POISON
FIRST AID TREATMENT
ANTIDOTES

CALL A PHYSICIAN AT ONCE.

Avoid contact with skin, eyes, nose, or throat.
Avoid prolonged or repeated breathing of vapor.
Use with adequate ventilation.
Do not take internally.

IF SWALLOWED – Give a tablespoonful of salt in a glass of warm water, and repeat until vomit fluid is clear. Give milk, or white of egg, beaten with water.

FOR INDUSTRY USE ONLY

OTHER HANDLING AND
STORAGE CONDITIONS